

PATENT SPECIFICATION

855930



DRAWINGS ATTACHED

Date of filing Complete Specification (under Section 3(3) of the Patents Act 1949) Jan. 6, 1958.

Application Date: Oct. 4, 1956. No. 30227/56.

Application Date: Jan. 4, 1958. No. 384/58

Complete Specification Published: Dec. 14, 1960

Index at Acceptance:- Class 52(2), B2A.

International Classification:- A47c.

COMPLETE SPECIFICATION

Improvements relating to Bedsteads

We, J. NESBIT EVANS AND COMPANY LIMITED, a Registered British Company, of King Street, Wednesbury, Staffordshire, and

5 JAMES KNOX NESBIT EVANS and DERMOT KNOX LLOYD NESBIT EVANS, both British Subjects, of the Company's address do hereby declare the invention, for which we pray that a patent may be
10 granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:-

15 This invention relates to hospital and like nursing bedsteads, of the kind in which a wire mattress platform is connected to the main bedstead structure.

It is orthodox practice to arrange the mattress platform at a predetermined height or so called hospital
20 height above floor level so that nursing staff can attend, without undue fatigue, to the requirements of patients. There are numerous bed patients of the semi-
25 ambulant type who, due to the height of the mattress platform, are unable to get out of and into bed without assistance.

It would considerably reduce the demands on nursing personnel if some simple and efficient means which would not add greatly to the cost of the bed-
30 stead could be provided whereby the platform would be lowered into a practical or domestic position for getting out of and into bed, and thereafter restored to hospital height.

40 The primary object of our invention is to provide a simple and safe solution to the problem.

According to the present invention a bedstead having a gearing at the head and foot ends for extending and re-
45 tracting the legs thereat, has a transmission member arranged under the plat-

form between said gearing, and clutch means is provided for coupling and uncoupling the gearing so that the legs can be moved either in unison or independently respectively for raising or lowering the platform or inclining it to a horizontal plane.

According to the present improvements in the invention described in our first application, the transmission member under the platform is
55 arranged to be axially displaceable relative to gearing provided at the foot and the head ends of the bedstead for imparting movement to telescopic legs thereat, the said member serving as one element of a gearing clutch for enabling the platform to be raised or lowered, or of it being inclined to a
60 horizontal plane according to a selected position of the said member relative to said gearing.

According to a preferred form of construction of this invention, alike gear boxes of the bevel gear type are provided at the head end and the foot end of the bedstead for transmitting through
70 traversing screw and nut mechanisms, raising or lowering movement to telescopic bedstead legs.

The displaceable transmission shaft has squared end parts which can be engaged with and disengaged from correspondingly shaped sockets in coaxial
80 horizontal driving pinions of the bevel gear; an end of said shaft is adapted to be rotated by a crank handle outside a gear box.

Each said driving pinion has a corresponding square boring leading into a
85 cylindrical counter bore of a diameter which is greater than that of a cylindrical part of said shaft. The latter is provided at a position between the gear boxes with a collar engaged by a
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[Price 3s.6d.]

yoke which is carried on a resilient selecting arm hinged at one end to the bedstead frame. This arm extends transversely of the bedstead and terminates at its free end with a handle, the arm being adapted selectively to engage spaced anchorages in a gate for holding the shaft against axial movement. Movement of the arm in a predetermined direction, within limits defined by the said anchorages, determines the extent of axial displacement of the transmission shaft. As this occurs, the squared part of the shaft is moved into or out of register with the square socket in the said driving pinions. Consequently, when in register, the gearings and shaft are coupled and said shaft will transmit corresponding motion to the remote gearing; when out of register, the shaft will be rotated whereas one or the other driving pinion will remain static.

When it is desired to raise the head end only in order to incline the platform towards the foot end, the said out of register position at the foot end of the squared part of the shaft relative to the driving pinion is attained by selection; rotation of the handle turns the shaft which idles in the driving pinion at the foot end, whereas at the head end the shaft and driving pinion are in register, and, consequently the gearing transmits lifting motion to said head legs.

It will be appreciated, therefore, that in the registering positions the shaft will transmit motion to the driving pinions of the alike gearings so that the mechanisms associated with the bedstead legs will raise or lower the telescopic legs in unison at both the head and foot ends of the bedstead, according to the direction of movement of the handle.

When it is desired to raise the foot end only in order to incline the platform from the foot to the head end, the registering position of the shaft and driving pinion at the foot end is attained by selection whereas the reverse conditions obtain at the head end; consequently, rotation of the shaft in the required direction transmits, through the gearing, lifting movement to the legs at the foot end whereas at the head end the shaft idles in the driving pinion and no motion is transmitted to the gearing thereat.

The invention will now be described by way of example, with reference to the accompanying drawings which illustrate two forms of construction of a bedstead.

Fig. 1 is a perspective view of the bedstead in which the head legs are raised in relation to the foot legs.

Fig. 2 is a perspective view of the bedstead in which the foot legs are raised in relation to the head legs. 70

Fig. 3 is a perspective view of the bedstead in which both foot and head legs are lowered.

Fig. 4 is a perspective view in which both foot and head legs are raised. 75

Fig. 5 is a diagrammatic plan of the raising mechanism related to the bedstead illustrated in Fig. 1. 80

Fig. 6 is a diagrammatic plan of the mechanism related to the bedstead, illustrated in Figs. 3 and 4

Fig. 7 is a diagrammatic plan of the mechanism related to the bedstead, illustrated in Fig. 2. 85

Fig. 8 is a longitudinal section of the driving pinion incorporated at the foot end of the bedstead.

Fig. 9 is an end view of Fig. 8. 90

Fig. 10 is a diagram of a modification.

Referring to Figs. 1 - 7 it will be observed that the bedstead comprises a platform 1 arranged between a head end 2 and a foot end 3, the head and foot ends 2, 3 respectively include telescopic legs 4, 5 which are operated in the known manner by traversing screw and nut mechanisms (not shown) incorporated in the central telescopic legs 6, 7 appertaining to the head legs 4, and foot legs 5; with reference to the foot end of the bedstead the traversing screw is fast with a pinion 8 which meshes with a driving pinion 9 on a horizontal axis and contained in a gear box 10; the driving pinion 8 is adapted to be rotated by a crank handle 11 on an adjustable transmission member 12, which extends longitudinally of the bedstead under the platform 1, the said transmission member being capable of being axially displaced in either direction. This transmission member 12 is in communication with the gearbox 10 and another similar gearbox 10a at the head end of the bedstead and is arranged selectively to operate the gearing of the telescopic legs according to selection by hospital personnel as to whether the platform 1 is to be raised or lowered, or whether the head end 2 or the foot end 3 is to be relatively inclined. As will be more readily observed from Figs. 5 - 9 the driving pinion 9 has a squared socket 13 which merges into a cylindrical counter bore 14; the adjoining part of the trans- 130

mission member 12 has a correspondingly squared section 15 and at least that adjoining part of the member 12 appertaining to the gear box at the foot end 3 has a cylindrical shank 16 which is of less diameter than that of the socket 13. Each gear box 10 is fitted with a removable cap 17.

Adjoining the foot end 3, the transmission member 12 has a collar 18 which is engaged by a yoke 19 carried on a resilient selecting arm 20, hinged at 21 on a vertical axis to a bracket under the platform 1. The arm 20 extends transversely under the platform 1 and terminates at its free end with a handle 22; the said arm 20 is adapted selectively to be engaged in spaced anchorages 23, 24, 25 in a gate 26 arranged remote from the point of hinging 21; the purpose of the selective movement of this arm 20 is to transmit axial displacement to the transmission member 12 within the limits defined by the anchorages 23, 24, 25, this displacement serving to determine the into or out of register of the squared section 15 relative to the corresponding socket 13. In the position illustrated in Fig. 1, the arm 20 is engaging the anchorage 23 and the arm has selected an axial movement of the member 12 whereby the squared part 15 is out of engagement with the corresponding socket 13 of the driving pinion 9 at the foot end 3, whereas at the head end 2 a corresponding squared section is engaged with the corresponding driving pinion 9; the result is that the cylindrical part 16 of the member 12 is in such a position that when the handle 11 is rotated the shank idles in the driving pinion 9. Consequently, rotation of the member 12 only transmits motion to the gearing at the head end 2 so that the traversing screw and nut mechanism, known per se, raises or lowers the telescopic legs 4 whereas no such movement is communicated to the legs 5, when the head end 2 is inclined towards the foot end making the bedstead suitable for a particular condition of a patient, according to hospital requirements.

When the arm 20 is engaged with the anchorage 24, the squared sections 15 and driving pinions 9 are engaged at both the head end 2 and the foot end 3 of the gearing, consequently, upon turning the handle 11 in the appropriate direction the platform 1 can be lowered, as illustrated in Fig. 3, or raised as in Fig. 4. If, however, it is desired to raise the foot

end 3 only in order to incline the platform 1 from foot to head end the selected position of the arm at 25 is taken, whereupon the transmission member 12 is axially displaced so that the squared section 15 and the corresponding socket 13 at the foot end of the bedstead are in register; whereas the reverse conditions obtain in the gearing at the head end 2.

It will be appreciated that the optional movement of the platform can be easily obtained merely by moving the arm 20 into a selected position for attaining the required axial displacement of the transmission shaft for coupling or uncoupling the gearing at the respective ends of the bedstead.

Obviously, the coupling and uncoupling conditions can be obtained by spline means on the shaft, and instead of employing the spring arm for selecting as above described, other spring means could be utilised for urging the shaft into out of engagement with the said driving pinions.

Referring now to Fig. 10, the transmission member 12 is arranged not to be axially displaceable, as has previously been described; instead the member 12 is provided with splined dogs 27, 28 which are adapted to be brought into and out of engagement with corresponding couplings, 29, 30, incorporated with the driving pinions 9 of the gear boxes 10 and 10a. In the diagram, there is indicated an arm similar to the arm 20 associated with each dog 27 and 28 for moving it axially about the relatively fixed member 12. It is remarked, however, that the form of construction illustrated with reference to Figs. 1 - 9 is preferred owing to its simplicity and facility for operation at one end of the bedstead. The advantages to be gained are considerable in relation to the old fashioned conventions in bedstead construction, and especially because under the invention the platform cannot collapse even if unauthorised persons should interfere with the selecting arm 20, as the load on the platform is always supported by the telescopic legs acting through the known traversing screw and nut mechanism associated with the legs.

WHAT WE CLAIM IS:-

1. A bedstead of the kind referred to, having a gearing at the head and foot ends for extending and retracting the legs thereat, a transmission member arranged under the platform between said gearing, and clutch means for coupling and uncoupling the shaft and

- the gearing, so that the legs can be moved either in unison or independently respectively for raising or lowering the platform, or inclining it to a horizontal plane.
2. A bedstead of the kind referred to, wherein a transmission member under the platform is arranged to be axially displaceable relative to gearing provided at the foot and the head ends of the bedstead for imparting movement to telescopic legs thereat, the said member serving as one element of a gearing clutch for enabling the legs and the platform to be raised or lowered, or of the platform being inclined to a horizontal plane according to a selected displacement of the said member relative to said gearing.
3. A bedstead according to claim 1 or 2, wherein alike gear boxes of the bevel gear type are provided centrally at the ends of the bedstead, and driving pinions of the gear boxes have sockets engageable with non-circular end parts of the transmission member, whereby the gearing at both ends of the bedstead can be coupled to move in unison.
4. A bedstead according to claim 3, wherein the driving pinion at least at one end of the bedstead has a counterbore into which the non-circular part of the transmission member can enter as selected by a manually operable selecting means associated with the said member.
5. A bedstead according to claim 4, wherein the said selecting means comprises an arm pivoted under the platform and extending transversely thereof for engagement with anchorages in a gate, the said arm having a yoke engaged with means on the member whereby the latter can be axially displaced in either direction.
6. A bedstead substantially as described with reference to Figures 1-9 of the accompanying drawings.
7. A bedstead substantially as described with reference to Figure 10 of the accompanying drawing.

For the Applicants

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PROVISIONAL SPECIFICATION

No. 30227 A.D. 1956

Improvements relating to Bedsteads

We, J. NESBIT EVANS AND COMPANY LIMITED, a Registered British Company, of King Street, Wednesbury, Staffordshire, and JAMES KNOX NESBIT EVANS and DERMOT KNOX LLOYD NESBIT EVANS, both British Subjects, of the Company's address, do hereby declare this invention to be described in the following statement:-

This invention relates to hospital and like nursing bedsteads, of the kind in which a wire mattress platform is connected to the main bedstead structure.

It is orthodox practice to arrange the mattress platform at a predetermined height above floor level so that nursing staff can attend, without undue fatigue, to the requirements of patients. There are numerous bed patients of the semi-ambulant type who,

due to the height of the mattress platform, are unable to get out of and into bed without assistance.

It would considerably reduce the demands on nursing personnel if some simple and efficient means which would not add greatly to the cost of the bedstead could be provided whereby the platform would be lowered into a practical position for getting out of and into bed, and thereafter restored to a normal position.

The primary object of our invention is to provide a simple and safe solution to the problem.

According to the present invention, the platform is supported at the head and foot ends of the bedstead by sets of telescopically engaging legs, one set of legs having a manually operable mechanism associated therewith whereby the said legs can be contracted or

extended, and being connected to a similar mechanism associated with the other set of legs by a coupling member extending longitudinally under said platform. The result is that a simultaneous contracting or extending movement is transmitted to both sets of legs in response to a manual operation by nursing personnel at one end of the bedstead. Consequently, the platform can be lowered or raised and maintained safely in the required position.

The lowering and raising mechanism may take various forms, for example, each set of telescopic legs is transversely connected by tubes which are interconnected by a telescopic tubular prop. The latter houses a traversing screw and nut transmission, the former being rotatable through bevel gearing from a crank handle movable on a generally horizontal axis and arranged at the foot end of the bedstead.

The gearings at the foot and head ends are coupled by a transmission tube arranged longitudinally under the said platform.

Preferably, a selective clutch is interposed between said transmission tube and the gearing at the foot end,

so that if desired an extended or contracted movement can be applied to one set of legs, or a relatively greater or smaller movement can be applied to one set of legs with respect to the other set in order to set the said platform at an inclination to a horizontal plane.

This clutch may be of a known type requiring axial displacement of the driving clutch member relatively to the driven member, for example, the driving member of a bevel gearing, deriving its motion from the said mechanism, may be coupled to a driven member on the said tube by providing said member with a non-circular boring, or with a dog, which can be mated with a corresponding part on the adjoining end of the transmission tube when the driving member is axially displaced.

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PROVISIONAL SPECIFICATION

No. 384 A.D. 1958

Improvements relating to Bedsteads

We, J. NESBIT EVANS AND COMPANY, LIMITED, a Registered British Company, of King Street, Wednesbury, Staffordshire, and

JAMES KNOX NESBIT EVANS and DERMOT KNOX LLOYD NESBIT EVANS, both British Subjects, of the Company's address, do hereby declare this invention to be described in the following statement:-

The present invention is a development or modification of the bedstead described in the specification of our application for Letters Patent No. 30227/56 and has for its primary object to provide simple, convenient and inexpensive manually operable mechanism by which the platform can be raised or lowered or inclined to a horizontal plane either towards the head end or the foot end of the bedstead and maintained in the desired adjusted position.

According to the present invention a bedstead having a gearing at the head and foot ends for extending and retracting the legs thereat, has a transmission member arranged under the platform between said gearing, and clutch means is provided for coupling and uncoupling the gearing so that the legs can be moved either in unison or independently respectively for raising or lowering the platform or inclining it to a horizontal plane.

According to the present improvements in the invention described in our said application, the transmission member under the platform is arranged to be axially displaceable relative to gearing provided at the foot and the head ends of the bedstead for imparting movement to telescopic legs thereat, the said member serving as one element of a gearing clutch for enabling the

platform to be raised or lowered, or of it being inclined to a horizontal plane according to a selected position of the said member relative to said gearing.

According to a preferred form of construction of this invention, alike gear boxes of the bevel gear type are provided at the head end and the foot end of the bedstead for transmitting through traversing screw and nut mechanisms, raising or lowering movement to telescopic bedstead legs.

The displaceable transmission shaft has squared end parts which can be engaged with and disengaged from correspondingly shaped sockets in coaxial horizontal driving pinions of the bevel gear; an end of said shaft is adapted to be rotated by a crank handle outside a gear box.

Each said driving pinion has a corresponding square boring leading into a cylindrical counter bore of a diameter which is greater than that of the squared part of said shaft. The latter is provided at a position between the gear boxes with a collar engaged by a yoke which is carried on a resilient selecting arm hinged at one end to the bedstead frame. This arm extends transversely of the bedstead and terminates at its free end with a handle, the arm being adapted selectively to engage spaced anchorages in a gate for holding the shaft against axial movement. Movement of the arm in a predetermined direction, within limits defined by the said anchorages, determines the extent of axial displacement of the transmission shaft. As this occurs, the squared part of the shaft is moved into or out of register with the square socket in the said driving pinions. Consequently, when in register, the gearings and shaft are coupled and said shaft will transmit corresponding motion to the remote gearing; when out of register, the shaft will be rotated whereas one or the other driving pinion will remain static.

When it is desired to raise the head end only in order to incline the platform towards the foot end, the said out of register position at the foot end of the squared part of the shaft relative to the driving pinion is attained by selection; rotation of the handle turns the shaft which

idles in the driving pinion at the foot end, whereas at the head end the shaft and driving pinion are in register, and, consequently, the gearing transmits lifting motion to said head legs.

It will be appreciated, therefore, that in the registering positions the shaft will transmit motion to the driving pinions of the alike gearings so that the mechanisms associated with the bedstead legs will raise or lower the telescopic legs in unison at both the head and foot ends of the bedstead, according to the direction of movement of the handle.

When it is desired to raise the foot end only in order to incline the platform from the foot to the head end, the registering position of the shaft and driving pinion at the foot end is attained by selection whereas the reverse conditions obtain at the head end; consequently, rotation of the shaft in the required direction transmits, through the gearing, lifting movement to the legs at the front end whereas at the head end the shaft idles in the driving pinion and no motion is transmitted to the gearing thereat.

It will be appreciated that the optional movement of the platform can be easily obtained merely by moving the arm into a selected position for attaining the required axial displacement of the transmission shaft for coupling or uncoupling the gearing at the respective ends of the bedstead.

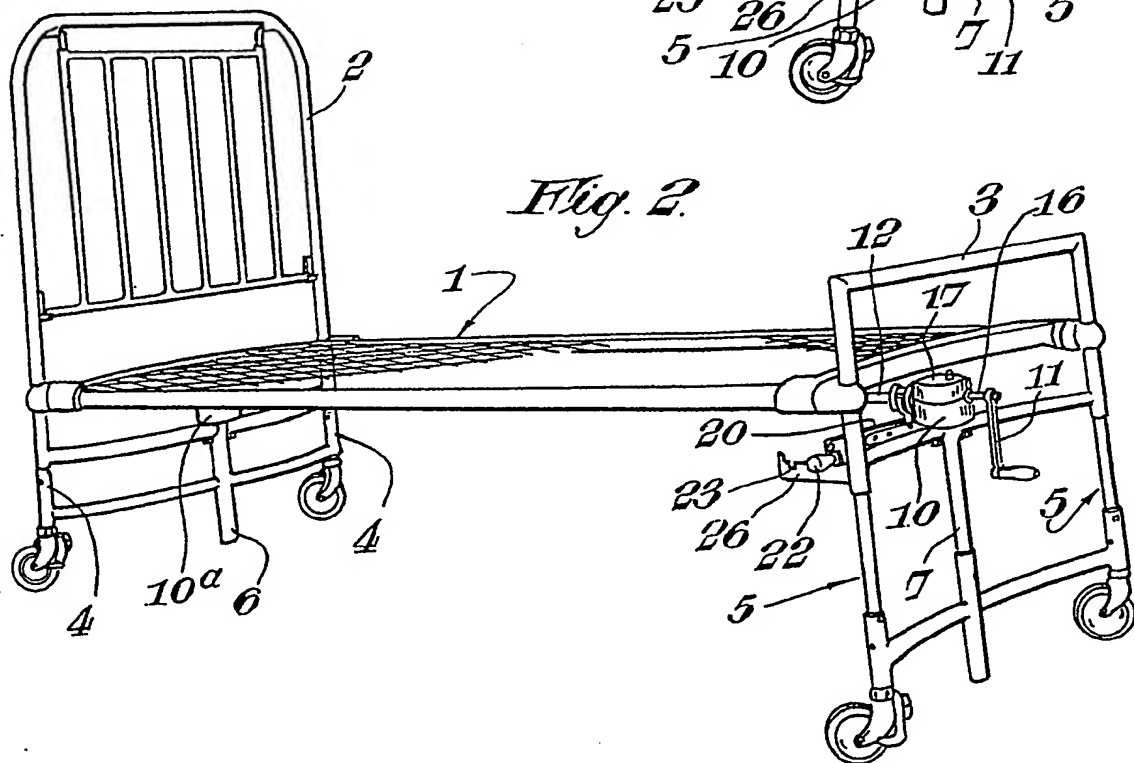
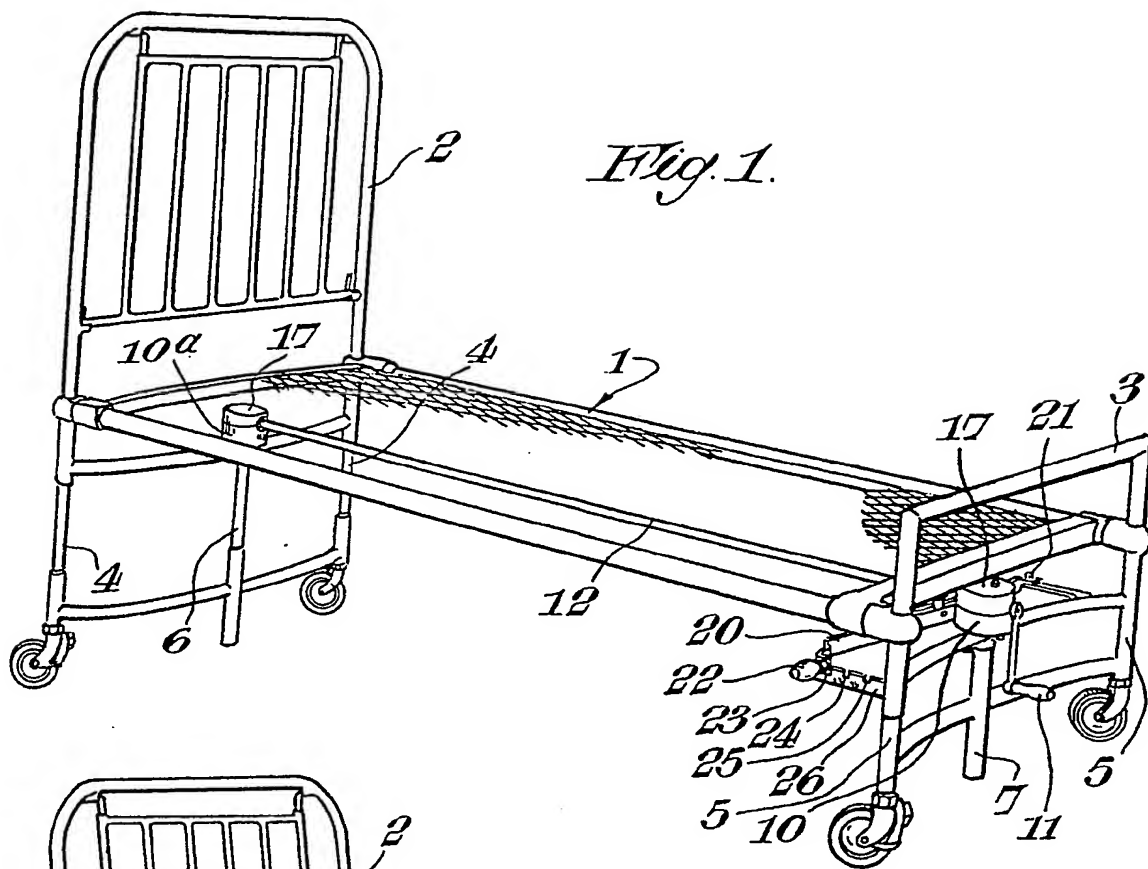
Obviously the coupling and uncoupling conditions can be obtained by spline means on the shaft, and instead of employing the spring arm for selecting as above described, other spring means could be utilised for urging the shaft into out of engagement with the said driving pinions.

In the broader aspect of the invention where the transmission shaft is not longitudinally displaceable, the shaft is provided with sliding dogs to engage the respective driving pinions.

For the Applicants

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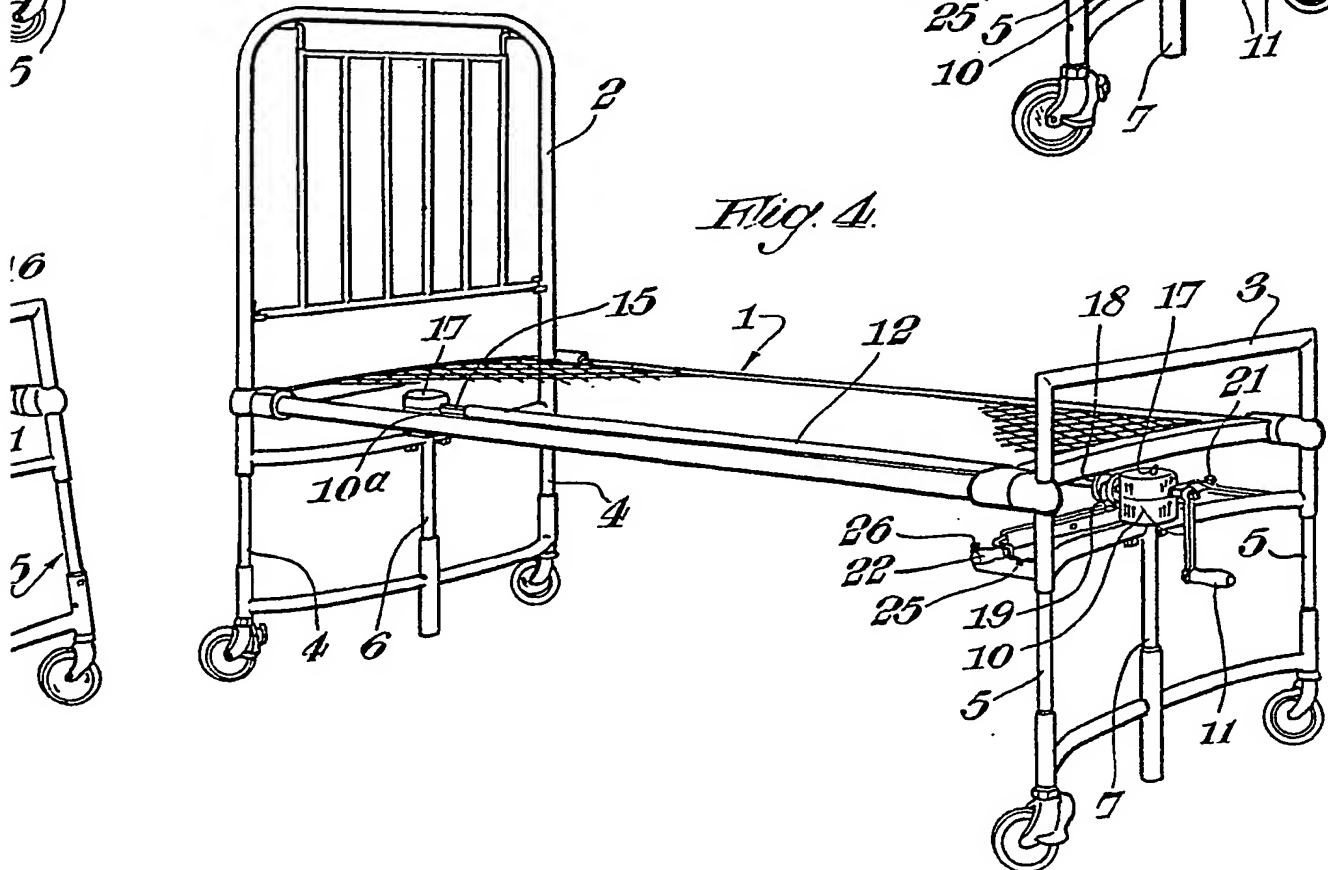
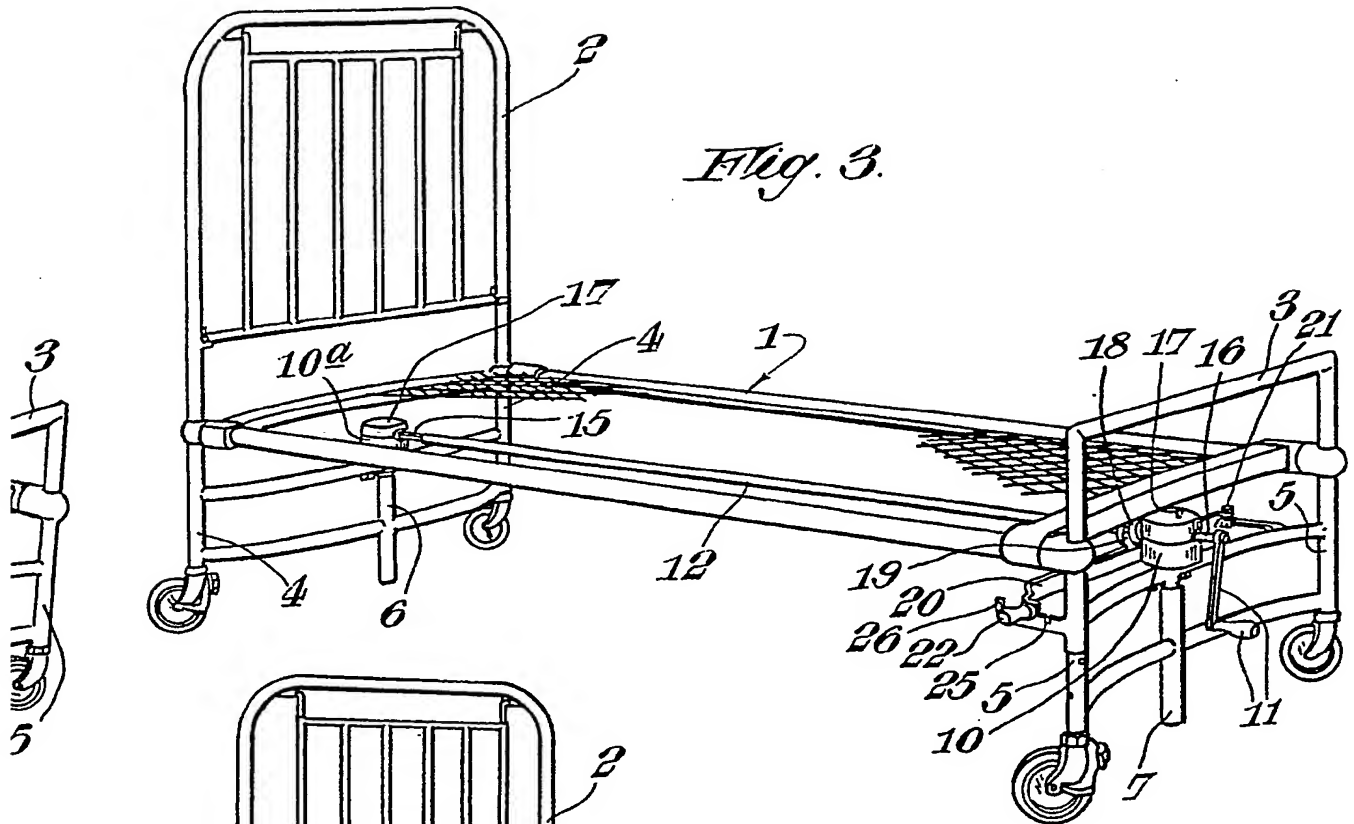


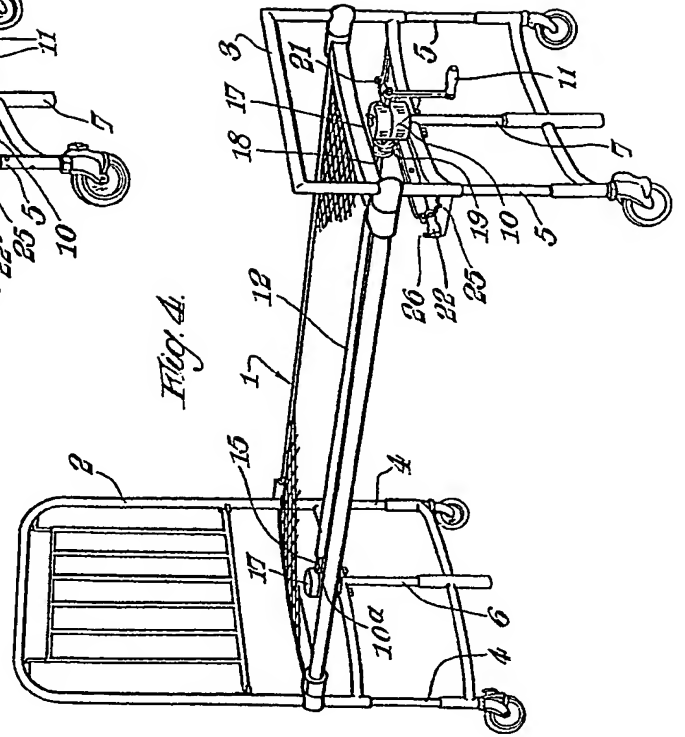
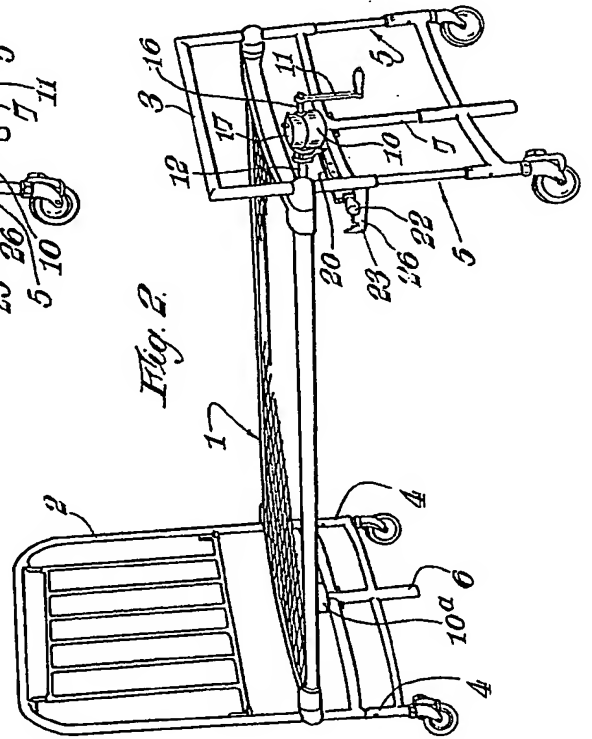
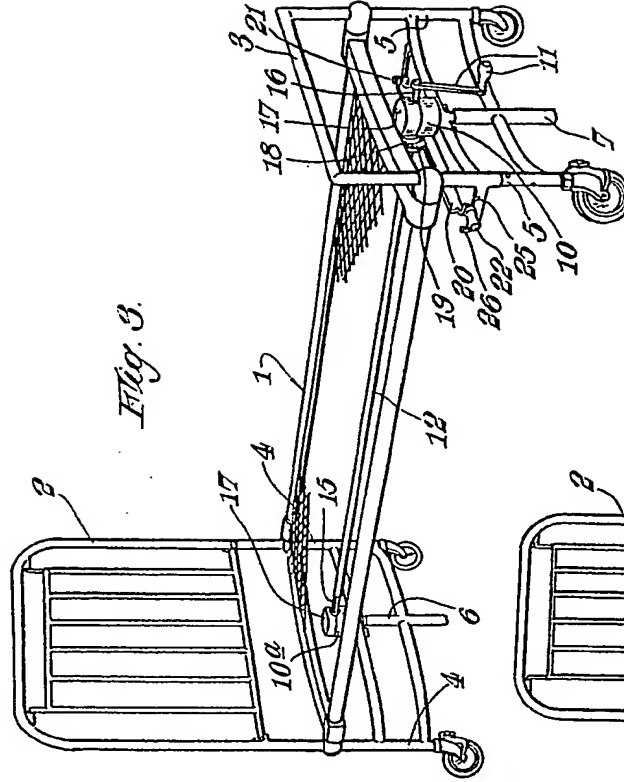
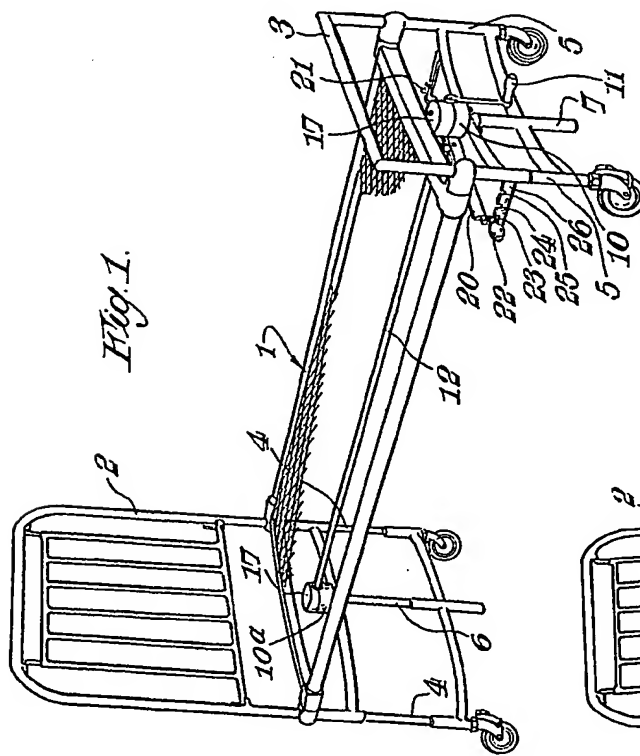
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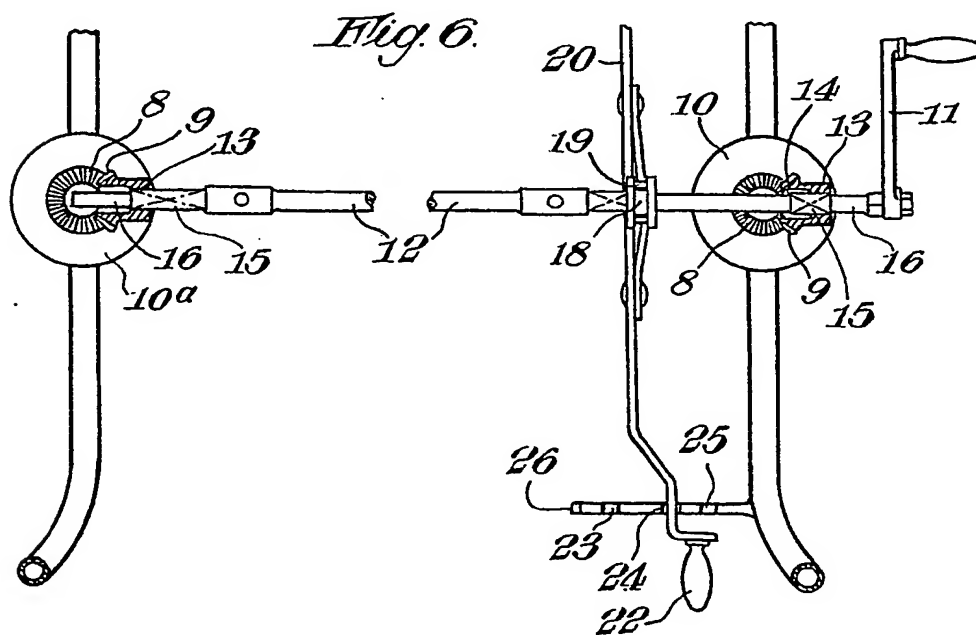
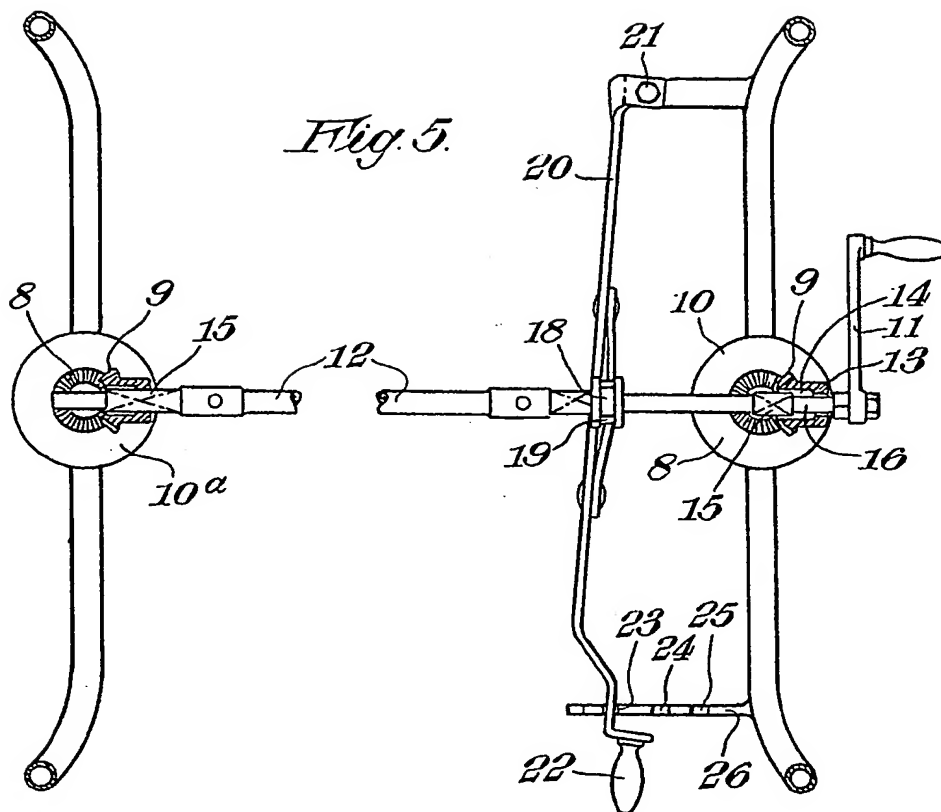
COMPLETE SPECIFICATION

4 SHEETS

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the Original on a reduced scale.
SHEETS 1 and 2







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COMPLETE SPECIFICATION

4 SHEETS

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SHEETS 3 and 4

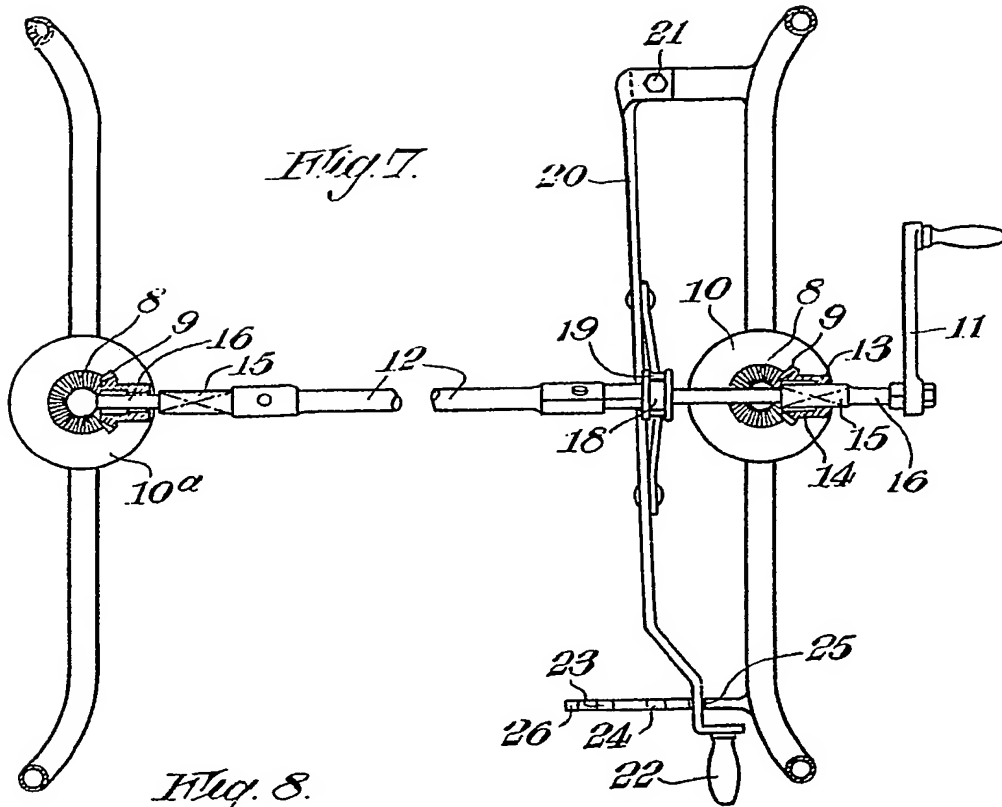


Fig. 8.

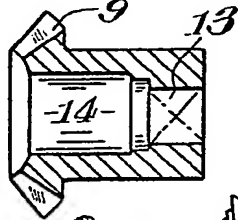


Fig. 9.

